



Conservation Planning for Migratory and resident birds of the Northern Andes:

Summary Comments

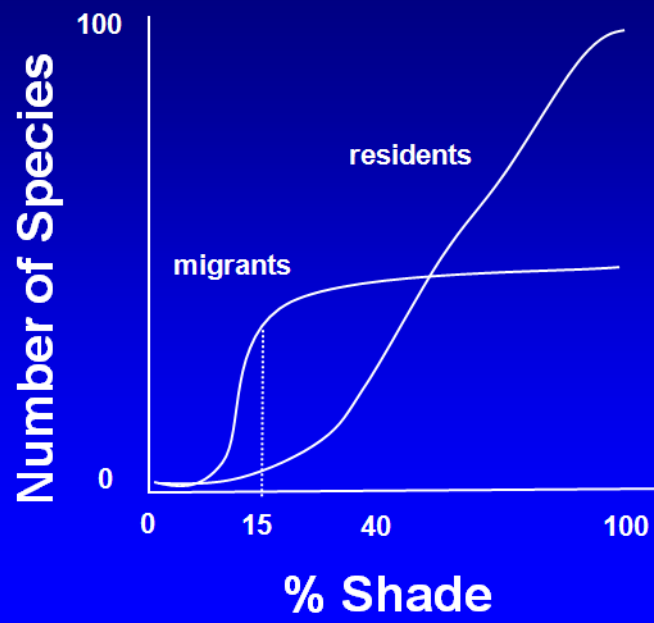
Peter P. Marra
National Zoological Park

*Smithsonian Migratory
Bird Center*

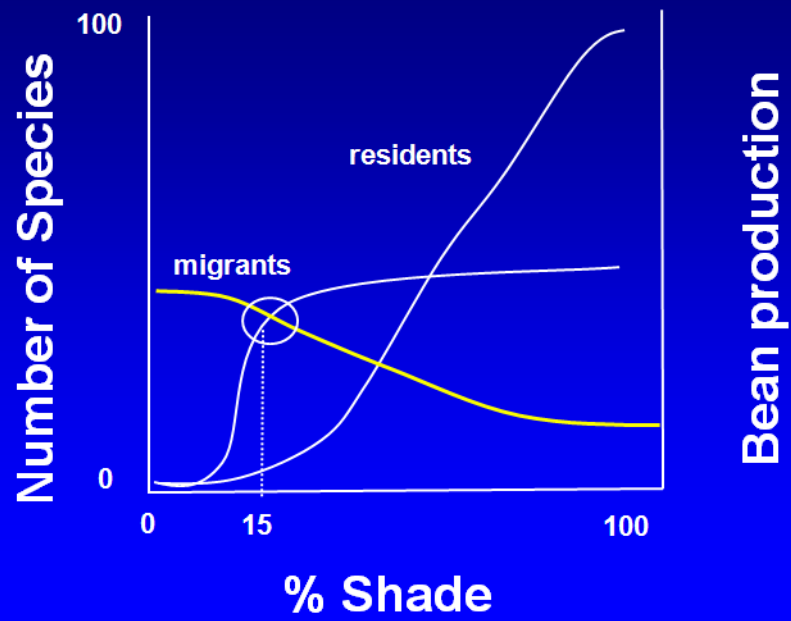
**Can we maximize coffee production
while maximizing shade?**



How much shade?



Should we re-think our certification criteria?



Should we re-think certification criteria?

- Re-examine the shade-tree/bird relationships
- Include forest offsets next to sun coffee
(similar to the conservation buffer strips)
- Whole farm and regional certification

Additional Research Needs



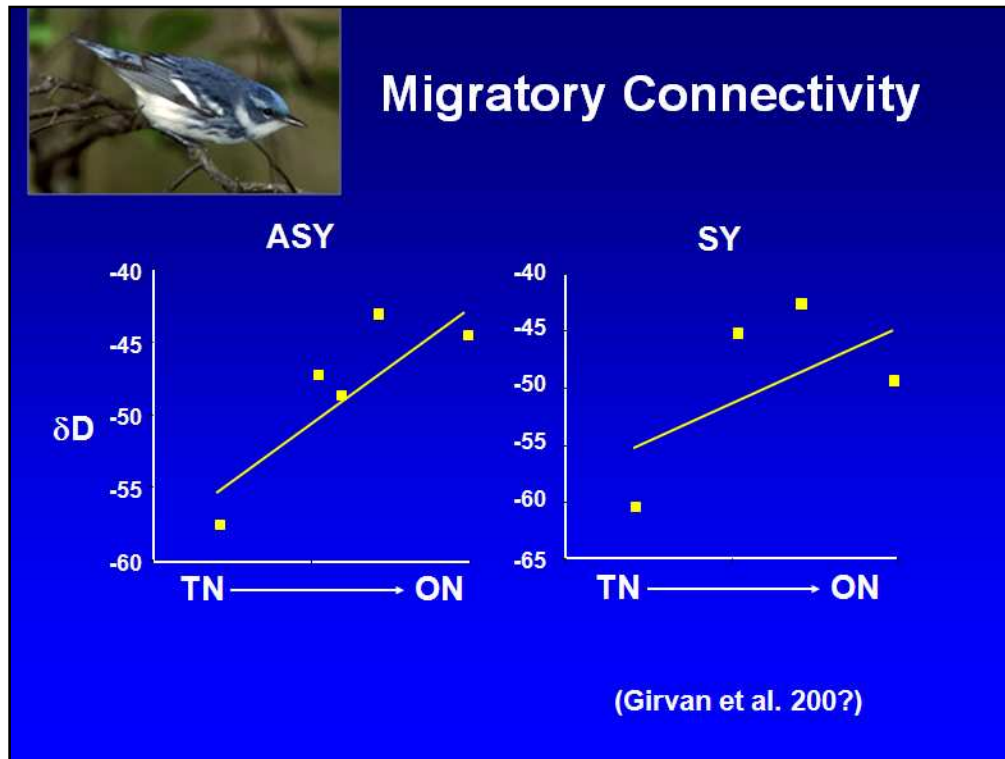
- Basic Natural History
- Habitat-specific performance
- Response to land-use changes
- Role of density-dependence, climate and climate change
- Incorporation of isotopes

Additional Research Questions with Isotopes (both species)

1. Determine if isotopes (Hydrogen & Carbon) can provide geographic clues to wintering biology:

- habitat breadth (Carbon)**
- geographic locality (Hydrogen)**

2. Assess the breadth of winter habitats occupied using by sampling carbon isotopes from individuals on arrival to breeding areas.



deltaD of crown feathers indicative of winter signature

high negative values indicate south winter range, low negative values indicate north winter range

Tennessee birds winter further north than Ontario birds = leapfrogging of populations

No sampling location exhibited significant differences between ASY and SY signature, implying no age-based segregation of males.

Sample size limitations with SY analysis, despite high F and low P

Additional Research Questions with Isotopes (both species)

2. Quantify winter survival in the context of breeding latitude.

- Potentially disentangles emigration from survival.**
- Are the source / sink calculations correct?**

Making the Connections

- **Creates stronger ties with people and communities throughout the annual cycle.**
- **Allows for targeted conservation**
- **Better understanding of limiting factors**

